

CLAIMS

What is claimed is:

1. An air conditioning system for a vehicle comprising:  
a hybrid compressor comprising a first compression mechanism driven by a drive source for driving said vehicle and a second compression mechanism driven by an electric motor;  
means for selecting a drive source for said compressor and switching the drive source;  
means for detecting a condition of a refrigeration cycle when said compressor is driven;  
and  
means for estimating a power consumption of said compressor due to a selected drive source in response to a value detected by said means for detecting a condition of the refrigeration cycle, when either said drive source for driving said vehicle or said electric motor is selected as said drive source for said compressor by said means for selecting a drive source.
2. The air conditioning system of claim 1, wherein said first compression mechanism and said second compression mechanism are formed integrally within said hybrid compressor.
3. The air conditioning system of claim 1, wherein when either said drive source for driving said vehicle or said electric motor is selected as said drive source for said compressor by said means for selecting a drive source, in response to said power consumption of said compressor due to said selected drive source, which is estimated by said means for estimating power consumption, a power consumption of said compressor due to a non-selected drive source is for generating substantially the same level of a cooling ability as that due to said selected drive source, is estimated.
4. The air conditioning system of claim 3, wherein said drive source for said compressor is selected by said means for selecting a drive source, by comparing to said estimated power consumption of said compressor due to said selected drive source and said estimated power consumption of said compressor due to said non-selected drive source.
5. The air conditioning system of claim 4, wherein said drive source for said compressor consuming less power is selected by said means for selecting a drive source, by comparing said estimated power consumption of said compressor due to said selected drive source with said estimated power consumption of said compressor due to said non-selected drive source.
6. The air conditioning system of claim 4, wherein said electric motor is not selected as said drive source for said compressor when said drive source for driving said vehicle is selected as

said drive source for said compressor by said means for selecting a drive source and when an estimated power consumption of said compressor due to said electric motor as said non-selected drive source is greater than a preset value.

7. The air conditioning system of claim 1 further comprising means for detecting a refrigeration cycle load to detect a thermal load on said refrigeration cycle, wherein when either said drive source for driving said vehicle or said electric motor is selected as said drive source for said compressor by said means for selecting a drive source, a power consumption of said compressor due to a non-selected drive source is estimated in response to a value detected by said means for detecting a refrigeration cycle load.

8. The air conditioning system of claim 7, wherein said drive source for said compressor is selected by said means for selecting a drive source by comparing said estimated power consumption of said compressor due to said selected drive source to said estimated power consumption of said compressor due to said non-selected drive source.

9. The air conditioning system of claim 8, wherein said drive source for said compressor consuming less power of said compressor is selected by said means for selecting a drive source by comparing said estimated power consumption of said compressor due to said selected drive source to said estimated power consumption of said compressor due to said non-selected drive source.

10. The air conditioning system of claim 8, wherein said electric motor is not selected as said drive source for said compressor when said drive source for driving said vehicle is selected as said drive source for said compressor by said means for selecting a drive source and when an estimated power consumption of said compressor due to said electric motor as said non-selected drive source is greater than a preset value.

11. The air conditioning system of claim 1, wherein said electric motor is selected as said drive source for said compressor when said drive source for driving said vehicle is selected as said drive source for said compressor by said means for selecting a drive source, a power consumption of said compressor per a preset unit time is calculated with respect to a value detected by said means for detecting a refrigeration cycle condition, and when said calculated mean power consumption is less than a preset value.

12. The air conditioning system of claim 1, wherein said electric motor is not selected as a sole drive source for said compressor when said drive source for driving said vehicle is selected

as said drive source for said compressor by said means for selecting a drive source, a mean power consumption of said compressor per a preset unit time is calculated with respect to a value detected by said means for detecting a refrigeration duty cycle condition, and when said calculated mean power consumption is greater than or equal to a preset value.

13. The air conditioning system of claim 1 further comprising an electromagnetic clutch for engaging and disengaging said drive source for driving said vehicle and said compressor, wherein said electric motor is not selected as said drive source for said compressor when said drive source for driving said vehicle is selected as said drive source for said compressor by said means for selecting a drive source, a calculated power consumption of said compressor in an excitation condition of said electromagnetic is greater than or equal to a preset value.

15. The air conditioning system of claim 1, wherein said means for detecting a refrigeration cycle condition detects at least one of a pressure at a high-pressure side and at a low-pressure side of said refrigeration cycle, a rotational speed of an engine of said vehicle, an input current to said electric motor, an input current to an inverter for driving said electric motor, an availability factor of said compressor, and a signal for controlling a displacement of said compressor.

16. The air conditioning system of claim 7, wherein said means for detecting a refrigeration cycle condition detects at least one of an outside temperature, a temperature in a vehicle compartment, an amount of sunshine, an amount of air discharged by a blower, a target air temperature at an exit of an evaporator, and a vehicle driving speed.